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(Research Article)
Investigation of acoustic waves propagation in deep waters

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Abstract

In large aquatic environments including oceans and seas, acoustic waves are widely used due to their ease of propagation, which in addition to helping to build accurate systems and equipment, can also be very useful in analyzing and processing data. The mode of propagation depends on the mass density and speed of acoustic waves in this completely heterogeneous environment, both of which depend on parameters such as temperature, salinity and pressure. In each region of this environment, the conditions of the mentioned parameters are completely unique. Therefore, as an example, two regions in the Atlantic ocean and the Indian ocean were studied and after extracting the variation of the above parameters in depth, using the applied method of transfer matrix, the amount of transmission of acoustic waves in these regions were investigated. The results show that significant changes in salinity and temperature in the layers near the surface, cause significant changes in mass density and speed of sound propagation and, consequently, sound impedance. Also, in various sedimentary layers near the ocean floor, the sound impedance experiences sudden and sharp changes, reducing the transmission by about 55%.

Keywords: Ocean, Acoustic waves, Transfer matrix, Transmission coefficient, Acoustic impedance.

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